

# Memory System Case Studies Mar. 20, 2008

## Topics

- P6 address translation
- x86-64 extensions
- Linux memory management
- Linux page fault handling
- Memory mapping

# Intel P6

(Bob Colwell's Chip, CMU Alumni)

## Internal designation for successor to Pentium

- Which had internal designation P5

## Fundamentally different from Pentium

- Out-of-order, superscalar operation

## Resulting processors

- Pentium Pro (1996)
- Pentium II (1997)
  - L2 cache on same chip
- Pentium III (1999)
  - The freshwater fish machines

## Saltwater fish machines: Pentium 4

- Different operation, but similar memory system
- Abandoned by Intel in 2005 for P6-based Core 2 Duo

# P6 Memory System

32 bit address space

4 KB page size

L1, L2, and TLBs

4-way set associative

Inst TLB

32 entries

8 sets

Data TLB

64 entries

16 sets

L1 i-cache and d-cache

16 KB

32 B line size

128 sets

L2 cache

unified

128 KB -- 2 MB

